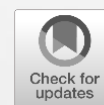


# Impact of COVID-19 lockdown on household income generation and food consumption in Gwagwalada, Abuja, Nigeria: A comparative study of formal and informal sector workers

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## Abstract

**Background:** At the beginning of 2020, Nigeria grappled with a severe outbreak of the global COVID-19 pandemic. This deadly disease significantly impacted various aspects of the country's economy, leading to socio-economic challenges primarily attributed to daily increases in reported cases and the subsequent enforcement of lockdown measures. Gwagwalada Area Council in Abuja, Nigeria, was not exempt from the devastating consequences of this epidemic, particularly concerning income generation and food access for its residents. Although several studies have examined the impact of COVID-19 on Nigerian workers, little information exists regarding the differing effects on formal and informal sector workers.

**Objective:** This study aimed to investigate the disparities in the consequences of the COVID-19 pandemic's lockdown on household income generation and food consumption among formal and informal sector workers in Gwagwalada Area Council, Abuja, Nigeria.

**Methods:** A descriptive survey design was employed for this study. Three hundred and thirty-two completed questionnaires were collected and analyzed. Data were analyzed using descriptive statistics, which included simple percentages and means and independent sample *t*-tests.

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## Article info

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**Results:** A significant difference was revealed in the impact of the lockdown between formal and informal sector workers ( $p < 0.001$ ). The lockdown impacted substantially on the informal sector workers more than the formal sector counterparts.

**Conclusion:** The study found that informal sector workers suffered a greater negative impact from the COVID-19 lockdown in Gwagwalada compared to formal sector workers. Therefore, it is recommended that the government provide substantial loans and grants with low or no interest rates to support informal sector business owners, mitigating the effects of the COVID lockdown and creating job opportunities for those affected by the government's lockdown measures. Additionally, introducing price control mechanisms to ensure affordable food prices is essential, even after the conclusion of the pandemic.

## Keywords

COVID 19; lockdown; policy measures; Abuja; Nigeria; informal sectors

## Background

The World Health Organization (WHO) officially declared the global pandemic status of the novel coronavirus (COVID-19) on 11 March 2020. This decision came after the virus was initially identified in Wuhan, China, in late December 2019 (WHO, 2020). On 30 January 2020, the WHO designated the outbreak a Public Health Emergency of International Concern. By 14 February 2020, the global tally included 49,053 laboratory-confirmed cases and 1,381 recorded fatalities (Harapan et al., 2020).

Numerous countries implemented various control measures in response to the perceived risk of contracting the disease (Chima et al., 2023). The introduction of infection-prevention measures, such as physical distancing, work-from-home arrangements, travel bans, and other personal hygiene practices, significantly weakened the economies of many nations (Syafiq et al., 2022). This economic vulnerability affected purchasing power and consumption, especially regarding food consumption. This aligns with several studies (Alie et al., 2019; Ukegbu et al., 2019) that have found a significant connection between a family's poor economic status and household food insecurity.

Notably, real per capita income decreased by 3.3% during the pandemic, and the global recession triggered by the disease resulted in the loss of 114 million jobs (Béné et al., 2021). This indicates that COVID-19 threatened food access, primarily through the loss of income and assets, which reduced individuals' ability to purchase food (Ghanbari Movahed et al., 2022).

It was explicitly stated that people's food consumption decreased in the early stages of the epidemic due to factors such as the inability to work or having reduced incomes (Midões & Seré, 2021; Su et al., 2022). The changes in consumption patterns were evident in both the quantity and the quality of food consumed, with individuals resorting to cheaper alternatives (Chang et al., 2021) and consuming fewer fruits, among other changes (Jia et al., 2021; Litton & Beavers, 2021). However, contrary to popular belief, some studies suggest that the pandemic increased food consumption. Research in this area indicates that the restrictions imposed by the pandemic altered people's eating habits, resulting in increased food purchases (Sim et al., 2020). Additionally, this perspective suggests that stress can lead to increased food consumption, and concerns about diseases may have contributed to overeating (Razzoli et al., 2017).

The low-income population was expected to suffer due to the epidemic, particularly those in the informal sector who had irregular employment and limited access to social and medical services (Harvey, 2022; World Bank, 2020). One study found that 60% of individuals in low-income countries experienced a significant reduction in income. According to the International Labour Organization (2020), informal workers in micro-industries (with fewer than ten employees) were the hardest hit, with 42% of women and 32% of men facing challenges. This was because they lacked social safety nets, unlike their counterparts in the formal sector. Informal workers are comparatively more vulnerable than formal workers (Pitoyo et al., 2021).

While many studies have been conducted on COVID-19 and its socioeconomic challenges, few, if any, have attempted to examine whether formal and informal sector workers were disproportionately affected during the lockdown using socioeconomic indicators such as income and consumption. Given those gaps, this study aims to assess the extent of the socioeconomic impact of the COVID-19 pandemic on formal and informal sector workers in Gwagwalada, Abuja, Nigeria. The study is significant because it aims to identify the sector that is most adversely affected and provide insights for policy recommendations to the government on allocating resources and other efforts to improve the well-being of that sector. To achieve this objective, the study seeks answers to the following research questions: 1) To what extent do the mean ratings of formal and informal sector workers differ regarding how COVID-19 influences household food consumption in Gwagwalada, Abuja, Nigeria? 2) What is the difference in the responses of formal and informal sector workers regarding how COVID-19 affects household income generation in Gwagwalada, Abuja, Nigeria?

In order to address these research questions, the study is guided by the following hypotheses: H1: There is no significant difference in the mean rating



on household food consumption between formal and informal sector workers.  
H2: There is no significant difference in the mean rating on household income generation between formal and informal sector workers.

## Literature Review

### *COVID-19 Lockdown*

The Federal Ministry of Health of Nigeria reported the first case of COVID-19 in Nigeria, involving an Italian man, on 27 February 2020 (Ebenso & Otu, 2020). He had traveled from northern Italy to Lagos and then to Ogun State, where he began experiencing illness and spent most of his time in isolation. The man received treatment for mild COVID-19 symptoms in a Lagos hospital. Following the identification of this index case, by 9 March 2020, the National Centre for Disease Control (NCDC) in Nigeria reported that suspected cases had been identified in five states, with some confirmed as positive (Ebenso & Otu, 2020).

To address these issues, the federal government implemented a series of programs to combat the virus, prevent disease transmission, and mitigate disruptions in economic and social life. The government introduced various measures, such as social distancing in locations like markets, mosques, churches, schools, banks, malls, airports, beaches, etc., all aimed at mitigating the spread of the COVID-19 pandemic. However, these policy measures had adverse consequences on the lives of the population in different areas, including unemployment, education, consumption, income generation, and health. Specifically, unemployment in Nigeria worsened due to the lockdown policy. As indicated by Obiakor et al. (2021), the dire unemployment situation in Nigeria was already affecting both the formal and informal sectors due to the coronavirus pandemic. Many employers were forced to lay off workers they couldn't afford to pay during the lockdown.

### *Household Income Generation*

The primary direct consequence of COVID-19 was mainly ascribed to its impact on employment, income, and the purchasing power of individuals affected by the measures enforced by local and national authorities during the initial 12 months of the pandemic (FSIN & Global Network Against Food Crises, 2020). This is especially noteworthy except for those who lost a family member to the virus.

To illustrate, during the period from May to July 2020, around 60% of the households surveyed in Addis Abeba, Ethiopia (Hirvonen et al., 2021), 31% in Nepal (Action Against Hunger et al., 2020), 80% in Myanmar (Headey et al., 2020), 75% in Nigeria (Amare et al., 2021), and 45% in the Caribbean (Béné et al., 2021) reported experiencing a decline in income. In Thailand, it was noted that

the pandemic had a devastating impact on informal sector workers. Among 384 surveyed informal sector employees, roughly 95% of respondents indicated a significant reduction in their income due to the pandemic (Komin et al., 2021). A study conducted by Hamadani et al. (2020) in Bangladesh revealed that 96% of the women surveyed reported a decrease in their family's monthly income from US\$212 before COVID-19 to \$59 per month during the lockdown.

According to Swarna et al. (2022), multiple studies from various countries have emphasized the pandemic's disastrous consequences on household income, and over two-thirds of respondents from the informal sector in Kenya and Uganda stated that the COVID-19 issue had led to a decline in their income (Kansiime et al., 2021). Household non-farm income in rural Ugandan families was found to have declined by 60% as firms lost revenues and people lost earnings (Mahmud & Riley, 2021). Food consumption per person reduced by over 40% during COVID-19, primarily due to employment and salary losses, while 84% of respondents in the Democratic Republic of the Congo reported decreased income (Stoop et al., 2021).

According to a survey, 36% of Ugandan respondents, 20% of Myanmar respondents, and 15% of Nepal respondents lost their usual sources of income during the lockdown (Swarna et al., 2022). In Bangladesh, the COVID-19 outbreak significantly affected people's socioeconomic circumstances and means of subsistence (Kumar & Pinky, 2021; World Bank, 2020).

In April 2020, a telephone survey indicated a 75% decline in income for individuals residing in urban slums and a 62% reduction in income for those in rural areas (Power and Participation Research Centre & BRAC Institute of Governance and Development, 2020). This situation resulted from factors such as job loss, reduced working hours, decreased income for businesses and entrepreneurs, suspension of specific activities, a shift to remote work, the necessity to stay home with children, elevated prices of particular food items, limited access to educational services, and other related elements. Numerous scientific investigations have affirmed that all these aspects have notably impacted household income (McKibbin & Fernando, 2021; Nicola et al., 2020; Siche, 2020).

### *Household Food Consumption*

A basic necessity to support human life is food. The function of food has transformed due to the Industrial Revolution and the advancement of civilization, expanding from simply meeting physiological requirements to providing health advantages beyond basic nutritional value (Firth et al., 2020).

When comparing the data collected in Nigeria in 2018 before the COVID-19 outbreak with the data from 2020, there are noticeable disparities in all four indices: meal skipping, food shortage, going without food for a full day, and food insecurity. However, other issues have also been reported. Decreased incomes and revenues were the primary factors exacerbating food insecurity (Béné et al., 2021).

During the COVID-19 period, almost all countries experienced substantial disruptions in their food supply networks, particularly affecting the most vulnerable, regardless of income level. Numerous issues that hindered people's access to food have received significant media attention. These include stay-at-home orders, physical restrictions on access to food markets and local food-gathering activities, loss of income from either fully or partially furloughed workers, and various other challenges (Stephens et al., 2020).

The COVID-19 outbreak has raised serious concerns about the potential for an increase in food poverty (Hirvonen et al., 2021). This troubling situation has triggered strong reactions regarding food supply, leading to emotional stress, unrest, reduced access to food, and heightened perceptions of the risk of food scarcity (Malachy, 2023).

## Methods

### Study Design

A descriptive survey research design was employed to identify and collect information about the characteristics of a specific problem or issue.

### Participants/Samples

The study participants were drawn from the formal and informal sectors in Gwagwalada Area Council, Abuja, Nigeria. In the formal sector, there were 1,109 employees from Gwagwalada Area Council and 2,246 employees from the University of Abuja Teaching Hospital. In contrast, in the informal sector, there were 56 members of the Vulcanizers Association, 220 members of the Motorcyclist Association (Okada Riders), 182 members from the Main Timber Dealers Association, and 123 members from the Park Road Traders Association in Gwagwalada Area Council. This added up to a total population of 3,936.

The rationale for selecting both the University of Abuja Teaching Hospital and the Gwagwalada Area Council workforce in the formal sector was to ensure equal participation opportunities for employees of both the Federal Government and the Local Government. In the case of the informal sector, the Vulcanizers Association, Motorcyclist Association (Okada riders), Main Timber Dealers Association, and Park Road Traders Association were chosen as they represent



the most organized informal groups with leaders and members, making them suitable sources of valid information. These groups were also significantly affected during the total lockdown in Gwagwalada Area Council. The study employed a stratified and simple random sampling technique to select participants, offering all population members an equal chance of being selected.

The sample size for the study consisted of 363 respondents. Taro Yamane's statistical formula (Yamane, 1973) was used to calculate the sample size. Additionally, the formula suggested by the University of California at Davis was employed to determine the sample size for each stratum ([www.statisticshowto.com/stratified-random-sample/](http://www.statisticshowto.com/stratified-random-sample/)).

### Measures and Data Collection

Data collection was based on a questionnaire. The survey was structured as a Likert scale, offering response options of Strongly Agree (SA), Agree (A), Undecided (U), Strongly Disagree (SD), and Disagree (D). These response options were assigned numerical values, with Strongly Agree (SA) rated as 5, Agree (A) as 4, Undecided (U) as 3, Strongly Disagree (SD) as 2, and Disagree (D) as 1. The questionnaire consisted of four sections. Section A gathered biographical information from the respondents, including details about their organization, years of service, level of education, marital status, and number of children. Section B focused on assessing the disparity in consumption levels between the formal and informal sectors in the Gwagwalada Area Council during the COVID-19 pandemic, while Section C compared the income generation levels of the formal and informal sectors in the same area during the pandemic.

### Data Analysis

Descriptive statistics, including the use of simple percentages and means, and independent sample t-tests were used. The statistical package for social science (SPSS 25 version) was used for the entire analysis. The decision rule was set at a 95% significance level, wherein the null hypothesis was rejected if the calculated p-value was less than 0.05 ( $p < 0.05$ ).

### Ethical Considerations

This study received approval from the Postgraduate School of the University of Abuja. Participants were given a signed letter from the researcher, assuring them that any information they provided would remain anonymous. The anonymity of respondents was further guaranteed by the fact that the questionnaires did not include any identifiers. The privacy and confidentiality of the participants were

strictly maintained. A part of this study has been somewhere else but with totally different aims and different dependent variables (Chima et al., 2023).

## Results

According to Table 1, the overall mean rating for formal sector employees was 2.29, while the mean rating for informal sector employees was 3.72. This suggests that informal sector workers in Gwagwalada Area Council generally agreed that the COVID-19 pandemic impacted income generation, as their mean rating (3.72) exceeded the midpoint of the 5-point Likert scale (3.0). In contrast, the formal sector workers' mean score of 2.29 was lower than the Likert scale midpoint of 3.0, indicating a disagreement among them. Therefore, it can be inferred that there is a significant difference in opinion between formal and informal sector workers regarding their income-generating capacity in Gwagwalada Area Council during the COVID-19 pandemic lockdown.

Table 1 Income generation level of both formal and informal workers

Statement	Sector	Response Categories					Total	Mean score	Decision
		SA (5)	A (4)	U (3)	D (2)	SD (1)			
My savings increased during the COVID-19 pandemic because I received a salary without spending money on transportation	Formal	126	39	1	0	0	166	4.75	Strongly Agree
	Informal	0	0	2	17	147	166	1.13	Disagree
My regular source of income was affected as a result of the restriction and closure of business activities during the COVID-19 lockdown	Formal	0	1	2	63	100	166	1.42	Disagree
	Informal	110	54	2	0	0	166	4.65	Strongly Agree
There were a lot of income losses in my family as we could no longer go out to source for our daily living	Formal	1	0	2	51	112	166	1.36	Disagree
	Informal	122	43	1	0	0	166	4.73	Strongly Agree
My family had to go on borrowing in order to survive the heat period of COVID-19 lockdown	Formal	2	6	4	91	63	166	1.75	Disagree
	Informal	71	66	4	10	15	166	4.01	Agree

The results of an independent two-sample *t*-test in Table 2 show that there was a significant difference in the responses of formal and informal sector workers regarding how the COVID-19 pandemic lockdown affects household income generation in Gwagwalada Area Council ( $t_{330}, p < 0.001$ ). The mean response of informal sector workers (mean = 3.72, SD = 0.3628) was significantly higher than that of formal sector workers (mean = 2.29, SD = 0.3577).

Table 2 COVID-19 pandemic lockdown and household income generation

Sectors	Total	Mean	SD	<i>t</i>	df	<i>p</i> -value
Formal	166	2.32	0.3577	-33.09	330	<0.001
Informal	166	3.63	0.3628			



The consumption levels of both formal and informal employees in Gwagwalada, Abuja, during the COVID-19 pandemic lockdown, are presented item by item in Table 3. The mean scores for the formal sector workers for items 1, 2, 3, and 5 were higher than the 5-point Likert scale measurement average of 3.0, while the mean score for item 4 was greater. Similarly, it was observed that the mean scores for all five categories surpassed the average for the 5-point Likert scale measurement for informal sector workers. The results also indicated that the sectional mean rating of informal sector workers was higher, with a mean score of 4.19, in contrast to the grand mean rating of formal sector workers at 2.45. The grand mean of informal sector workers (4.19) exceeded the average of the five Likert scales (3.0). Conversely, the mean score of 2.45 for formal sector workers, lower than the average of the five Likert scales at 3.0, suggests their disagreement with the notion that the COVID-19 pandemic did not significantly affect consumption levels. This finding reveals that workers in the informal economy concurred that the lockdown imposed during the COVID-19 pandemic substantially impacted the level of consumption in Gwagwalada Area Council.

Table 3 Description of consumption level of both formal and informal sector workers

Statement	Sector	Response Categories					Total	Mean score	Decision
		SA (5)	A (4)	U (3)	D (2)	SD (1)			
My family could not afford three square meals in a day during the COVID-19 pandemic	Formal	3	10	8	106	39	166	1.99	Disagree
	Informal	79	80	5	2	0	166	4.42	Agree
The level of consumption in my family reduced drastically as we could not go out to source for our daily income during the lockdown	Formal	1	0	2	115	48	166	1.74	Disagree
	Informal	105	59	2	0	0	166	4.62	Strongly Agree
Disruption in food supply chains, which led to high price volatility, affected my family's level of consumption	Formal	13	31	9	74	39	166	2.43	Disagree
	Informal	76	81	9	0	0	166	4.40	Agree
Compared to other years, my family spends more on food consumption	Formal	57	100	2	3	4	166	4.22	Agree
	Informal	62	93	6	5	0	166	4.28	Agree
My family could no longer store food as a result of restrictions in our daily income generation during the period of lockdown	Formal	2	0	3	103	58	166	1.70	Disagree
	Informal	77	84	3	0	2	166	4.41	Agree

Table 4 COVID-19 pandemic lockdown and household food consumption

Sectors	Total	Mean	SD	t	df	p-value
Formal	166	2.42	0.3505	-56.38	330	<0.001
Informal	166	4.43	0.2967			

The results of an independent two-sample *t*-test in Table 4 reveal a significant difference in the means of formal and informal sector workers regarding how the COVID-19 pandemic lockdown affects household food consumption in Gwagwalada Area Council ( $t_{330}$ ,  $p < 0.001$ ). The responses from the informal

sector significantly exceeded those from the formal sector, with a mean of 4.19 (SD = 0.2967) compared to a mean of 2.45 (SD = 0.3505). The calculated mean difference between the two groups of workers was 1.74.

## Discussion

### COVID-19 Pandemic Lockdown and Household Income Generation

The analysis of this section's findings reveals a significant disparity in the perceptions of formal and informal workers regarding their household income generation during the COVID-19 pandemic lockdown. The COVID-19 lockdown had a more pronounced impact on informal sector workers. The central issue here is that informal sector workers depend heavily on daily income for survival, which was severely constrained by the government's COVID-19 lockdown policy. With restrictions, they could not work for their daily income, making it highly challenging to supplement their earnings.

In contrast, formal sector workers receive monthly salaries, even when not working, which provides a safety net that informal sector workers lack. Furthermore, the primary income sources for informal sector workers, such as daily wages, farming, and self-employment, were all disrupted. This outcome aligns with the widely accepted belief that the COVID-19 crisis had a detrimental effect on job creation and income generation during the lockdown. This is consistent with findings from [Komin et al. \(2021\)](#), which indicate that business activities suffered due to lockdown restrictions.

Formal and informal sectors reported similar effects of the pandemic on household income generation, with varying proportions of respondents affected. Proportionally, more respondents in the informal sector cited complete income loss due to the pandemic compared to the formal sector. This finding aligns with the [African Development Bank \(2020\)](#) that informal sector workers were the worst affected by the government's lockdown policies during the COVID-19 pandemic. These individuals, typically at the lower end of the socioeconomic spectrum, are often characterized by poverty, low levels of education, limited access to finance, and minimal working capital. The informal sector constitutes a significant portion of the country's workforce. It provides livelihoods and employment to many citizens, as emphasized by the [International Labour Organization \(2020\)](#), highlighting the severe impact of lockdowns on labor markets, particularly in the informal sector.

### COVID-19 Pandemic Lockdown and Household Food Consumption

The findings regarding the impact of the COVID-19 lockdown on household food consumption in Gwagwalada Area Council indicate significant differences in

respondents' perspectives from the formal and informal sectors. The informal sector workers' grand mean rating was higher than that of formal sector workers. In summary, during the lockdown, the consumption level of informal sector workers was lower than that of formal sector workers.

Household food consumption in the informal sector significantly decreased during the lockdown due to restrictions that limited their ability to earn the daily income necessary to feed their families. This left them unable to afford three square meals, exacerbated by disruptions in the food supply chain and rising food prices. This finding is consistent with the observations of [Edwards \(2020\)](#) regarding the impact of the COVID-19 lockdown on household consumption, particularly affecting the informal sector, which comprises individuals facing unemployment. Similarly, [Hirvonen et al. \(2021\)](#) also pointed out that the COVID-19 lockdown raised concerns about potential food poverty.

### Limitations

The study primarily focused on formal and informal sector workers in the Gwagwalada Area Council, limiting the generalizability of the findings to other areas with varying COVID-19 experiences. Additionally, the study utilized a relatively small sample size of 332 participants, which may raise questions about the findings' applicability to a larger population. These limitations should be considered, and future research should seek to validate the results.

### Implications and Recommendations

The findings highlight the importance of governments providing explicit support to individuals engaged in informal employment to create a fair and robust environment for these workers, who were disproportionately affected by the COVID-19 pandemic.

#### *Household Income Generation*

Even though the COVID-19 lockdown has ended, there is a need for low-interest or interest-free loans, subsidies, and other forms of support for business owners who lost their jobs during the lockdown. This support will help businesses stabilize, prevent further layoffs, and enable them to continue generating income. Implementing measures like postponing payroll taxes, government housing loans, and other deductions for formal sector workers will aid their recovery from the destabilizing effects of the COVID-19 lockdown. Moreover, the Area Council should promote agricultural schemes that cultivate large land areas across all communities. Farmers should receive mechanized farming equipment



to enhance their productivity, providing direct and indirect social and economic support to millions of residents affected by the COVID-19 lockdown.

#### *Household Food Consumption*

A regulatory framework for commodity prices should be established to mitigate the adverse effects of the COVID-19 lockdown on people. This can be achieved by lowering the prices of essential commodities like fuel and food to improve affordability. Additionally, the government should initiate regular food distribution campaigns, particularly in the areas most affected by the lockdown. Stricter rules and policies should be enacted to empower small and medium-sized businesses, enabling them to participate in local, regional, and global food supply chains. Insurance, transfers, and input distribution should be introduced to protect farmers and small-scale agricultural producers from income loss and uncertainty.

## Conclusion

The results indicate that the COVID-19 lockdown had a more significant impact on informal sector workers than on formal sector workers in Gwagwalada Area Council, particularly regarding household income generation and food consumption. The study highlights the challenges faced by informal sector workers, who were the most affected group in the area council due to the pandemic's lockdown.

#### Declaration of Conflicting Interest

The authors assert that there are no conflicts of interest pertaining to the research, authorship, and publication of this paper.

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#### Authors' Contributions

Joseph Malachy was responsible for document searching, outline creation, draft article composition, and final article completion. The text underwent a quality review and was subsequently reviewed and corrected by Chima Paul and Yusuf Lawal. Dr. Chima Paul and Dr. Yusuf Lawal also carried out document searches and performed various data-related tasks, such as data collection, cleaning, entry, and analysis. All authors approved the final version of the article to be published.

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#### Data Availability Statement

All datasets generated and analyzed during the study process are not made public but available from the corresponding author upon reasonable request.

#### Declaration of the Use of AI in Scientific Writing

Nothing to declare.

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